Microsemi
SCOTTSDALE DIVISION

1N5221UR thru 1N5281BUR, e3
(or MLL5221 thru MLL5281B, e3)

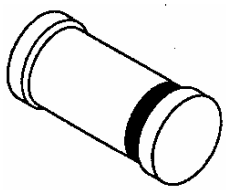
500 mW GLASS SURFACE MOUNT ZENER DIODES

DESCRIPTION

The 1N5221BUR thru 1N5281BUR series of 0.5 watt Zener Voltage Regulators provides a surface mount equivalent to the popular JEDEC registered 1N5221B to 1N5281B for 2.4 to 200 volts in standard 5% tolerances as well as tighter tolerances identified by different suffix letters on the part number. These are also available with an internal-metallurgical-bond option by adding a "-1" suffix (see separate data sheet). Microsemi also offers numerous other Zener products to meet higher and lower power applications.

IMPORTANT: For the most current data, consult *MICROSEMI's* website: http://www.microsemi.com

APPEARANCE



DO-213AA

FEATURES

- Surface mount equivalents to the JEDEC registered 1N5221 thru 1N5281B series
- Hermetically sealed surface mount package
- RoHS Compliant devices available by adding "e3" suffix
- Internal metallurgical bond option available by adding a "-1" suffix (see separate data sheet for same part numbers with "-1" suffix)
- DO-7 or DO-35 glass body axial-leaded Zener equivalents also available per JEDEC registration (see separate data sheet for part numbers 1N5221 thru 1N5281B series

APPLICATIONS / BENEFITS

- Regulates voltage over a broad operating current and temperature range
- Selection from 2.4 to 200 V
- Standard voltage tolerances are plus/minus 5% with B suffix identification and 10 % with A suffix
- Tight tolerances available in plus or minus 2% or 1% with C or D suffix respectively
- Nonsensitive to ESD per MIL-STD-750 Method 1020
- Minimal capacitance (see Figure 3)
- Inherently radiation hard as described in Microsemi MicroNote 050

MAXIMUM RATINGS

- Operating and Storage temperature: -65°C to +175°C
- Thermal Resistance: 150°C/W junction to end cap and 300°C/W junction to ambient when mounted on FR4 PC board (1 oz Cu) with recommended footprint (see last page)
- Steady-State Power: 0.5 watts at end cap temperature $T_{EC} \leq 100^{o}C$ or ambient temperature $T_A \leq 25^{o}C$ when mounted on FR4 PC board as described for thermal resistance above (see Figure 2 for derating)
- Forward voltage @200 mA: 1.1 volts (maximum)
- Solder Temperatures: 260°C for 10 seconds (max)

MECHANICAL AND PACKAGING

- CASE: Hermetically sealed glass DO-213AA (SOD80 or MLL34) MELF style package
- FINISH: End caps Tin-Lead or RoHS Compliant annealed matte-Tin plating solderable per MIL-STD-750, method 2026
- POLARITY: Cathode indicated by band where diode is to be operated with the banded end positive with respect to the opposite end for Zener regulation
- MARKING: cathode band only
- TAPE & REEL option: Standard per EIA-481-B with 12 mm tape, 2000 per 7 inch reel or 5000 per 13 inch reel (add "TR" suffix to part number)
- WEIGHT: 0.04 grams
- See package dimensions on last page

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ELECTRICAL CHARACTERISTICS*

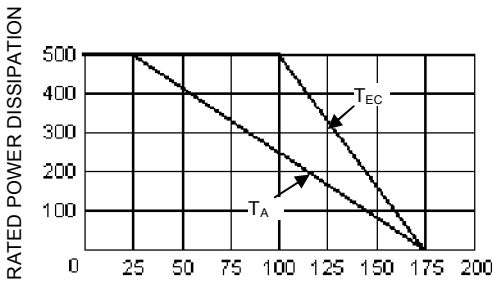
INDUSTRY PART NUMBER (NOTES 1 & 4)	Nominal Zener Voltage V_Z @ I_{ZT} (Note 2)	Test Current I_{ZT}	Max Zener Impedance A and B suffix only		Max Reverse Leakage Current				Max Zener Voltage Temperature Coeff. (A and B Suffix only) (Note 3)
					A and B Suffix only			Non-Suffix	
	Volts	mA	Z_{ZT} @ I_{ZT} Ohms	Z_{ZK} @ I_{ZK} = 0.25Ma Ohms	I_R µA	@ V_R Volts A	B	I_R @ V_R Used for Suffix A µA	α_{VZ} (%/°C)
1N5221UR	2.4	20	30	1200	100	0.95	1.0	200	-0.085
1N5222UR	2.5	20	30	1250	100	0.95	1.0	200	-0.085
1N5223UR	2.7	20	30	1300	75	0.95	1.0	150	-0.080
1N5224UR	2.8	20	30	1400	75	0.95	1.0	150	-0.080
1N5225UR	3.0	20	29	1600	50	0.95	1.0	100	-0.075
1N5226UR	3.3	20	28	1600	25	0.95	1.0	100	-0.070
1N5227UR	3.6	20	24	1700	15	0.95	1.0	100	-0.065
1N5228UR	3.9	20	23	1900	10	0.95	1.0	75	-0.060
1N5229UR	4.3	20	22	2000	5.0	0.95	1.0	50	+/-0.055
1N5230UR	4.7	20	19	1900	5.0	1.9	2.0	50	+/-0.030
1N5231UR	5.1	20	17	1600	5.0	1.9	2.0	50	+/-0.030
1N5232UR	5.6	20	11	1600	5.0	2.9	3.0	50	+0.038
1N5233UR	6.0	20	7.0	1600	5.0	3.3	3.5	50	+0.038
1N5234UR	6.2	20	7.0	1000	5.0	3.8	4.0	50	+0.045
1N5235UR	6.8	20	5.0	750	3.0	4.8	5.0	30	+0.050
1N5236UR	7.5	20	6.0	500	3.0	5.7	6.0	30	+0.058
1N5237UR	8.2	20	8.0	500	3.0	6.2	6.5	30	+0.062
1N5238UR	8.7	20	8.0	600	3.0	6.2	6.5	30	+0.065
1N5239UR	9.1	20	10	600	3.0	6.7	7.0	30	+0.068
1N5240UR	10	20	17	600	3.0	7.6	8.0	30	+0.075
1N5241UR	11	20	22	600	2.0	8.0	8.4	30	+0.076
1N5242UR	12	20	30	600	1.0	8.7	9.1	10	+0.077
1N5243UR	13	9.5	13	600	0.5	9.4	9.9	10	+0.079
1N5244UR	14	9.0	15	600	0.1	9.5	10	10	+0.082
1N5245UR	15	8.5	16	600	0.1	10.5	11	10	+0.082
1N5246UR	16	7.8	17	600	0.1	11.4	12	10	+0.083
1N5247UR	17	7.4	19	600	0.1	12.4	13	10	+0.084
1N5248UR	18	7.0	21	600	0.1	13.3	14	10	+0.085
1N5249UR	19	6.6	23	600	0.1	13.3	14	10	+0.086
1N5250UR	20	6.2	25	600	0.1	14.3	15	10	+0.086
1N5251UR	22	5.6	29	600	0.1	16.2	17	10	+0.087
1N5252UR	24	5.2	33	600	0.1	17.1	18	10	+0.088
1N5253UR	25	5.0	35	600	0.1	18.1	19	10	+0.089
1N5254UR	27	4.6	41	600	0.1	20	21	10	+0.090
1N5255UR	28	4.5	44	600	0.1	20	21	10	+0.091
1N5256UR	30	4.2	49	600	0.1	22	23	10	+0.091
1N5257UR	33	3.8	58	700	0.1	24	25	10	+0.092
1N5258UR	36	3.4	70	700	0.1	26	27	10	+0.093
1N5259UR	39	3.2	80	800	0.1	29	30	10	+0.094
1N5260UR	43	3.0	93	900	0.1	31	33	10	+0.095
1N5261UR	47	2.7	105	1000	0.1	34	36	10	+0.095
1N5262UR	51	2.5	125	1100	0.1	37	39	10	+0.096
1N5263UR	56	2.2	150	1300	0.1	41	43	10	+0.096
1N5264UR	60	2.1	170	1400	0.1	44	46	10	+0.097
1N5265UR	62	2.0	185	1400	0.1	45	47	10	+0.097
1N5266UR	68	1.8	230	1600	0.1	49	52	10	+0.097
1N5267UR	75	1.7	270	1700	0.1	53	56	10	+0.098
1N5268UR	82	1.5	330	2000	0.1	59	62	10	+0.098
1N5269UR	87	1.4	370	2200	0.1	65	68	10	+0.099
1N5270UR	91	1.4	400	2300	0.1	66	69	10	+0.099
1N5271UR	100	1.3	500	2600	0.1	72	76	10	+0.0110
1N5272UR	110	1.1	750	3000	0.1	80	84	10	+0.0110
1N5273UR	120	1.0	900	4000	0.1	86	91	10	+0.0110
1N5274UR	130	.95	1100	4500	0.1	94	99	10	+0.0110
1N5275UR	140	.90	1300	4500	0.1	101	106	10	+0.0110
1N5276UR	150	.85	1500	5000	0.1	108	114	10	+0.0110
1N5277UR	160	.80	1700	5500	0.1	116	122	10	+0.0110
1N5278UR	170	.74	1900	5500	0.1	123	129	10	+0.0110
1N5279UR	180	.68	2200	6000	0.1	130	137	10	+0.0110
1N5280UR	190	.66	2400	6500	0.1	137	144	10	+0.0110
1N5281UR	200	.65	2500	7000	0.1	144	152	10	+0.0110

* T_A = 25°C unless otherwise noted. Based on dc measurements at thermal equilibrium; case temperature maintained at 30 +/- 2°C. V_F = 1.1V max @ I_F = 200 mA for all types. See further Notes on following page.

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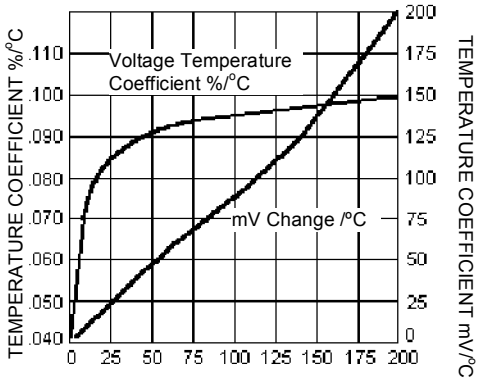
NOTE 1: Table as shown lists type numbers, which indicate a tolerance of +/-20% with guaranteed limits on only V_Z, I_R, and V_F. Devices with guaranteed limits on all six parameters are indicated by suffix "A" for +/-10%, "B" for +/-5%, "C" for +/-2%, and "D" for +/-1% tolerance.
NOTE 2: The electrical characteristics are measured after allowing the device to stabilize for 20 seconds.
NOTE 3: Temperature coefficient (α_{VZ}). Test conditions for temperature coefficient are as follows:
a. I_{ZT} = 7.5 mA, T_1 = 25°C,
T_2 = 125°C (1N5221AUR & BUR thru 1N5242AUR & BUR)
b. I_{ZT} = Rated I_{ZT}, T_1 = 25°C,
T_2 = 125°C (1N5243AUR & BUR thru 1N5281AUR & BUR)
Device to be temperature stabilized with current applied prior to reading breakdown voltage at the specified ambient temperature.
NOTE 4: These devices may be ordered as either 1N5221UR thru 1N5281BUR or as MLL5221 thru MLL5281B part numbers.

GRAPHS



T_{EC} – End Cap Temperature (°C), or
T_A Ambient Temperature on FR4 PC BOARD

FIGURE 1
POWER DERATING CURVE



NOMINAL ZENER VOLTAGE (VOLTS)

FIGURE 2
ZENER VOLTAGE TEMPERATURE
COEFFICIENT vs. ZENER VOLTAGE

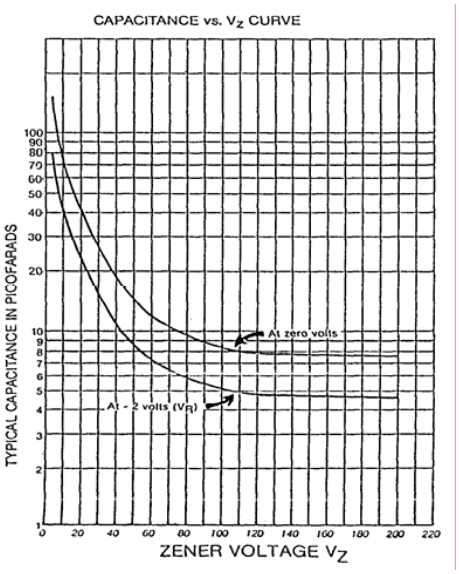
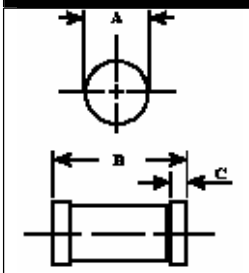
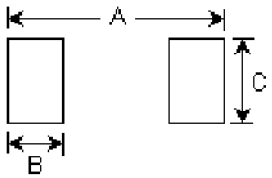


FIGURE 3
CAPACITANCE vs. ZENER VOLTAGE
(TYPICAL)

PACKAGE DIMENSIONS



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.063	0.067	1.60	1.70
B	0.130	0.146	3.30	3.70
C	0.016	0.022	0.41	0.55



PAD LAYOUT

	INCHES	mm
A	.200	5.08
B	.055	1.40
C	.080	2.03

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